In the outstanding Office Action, Claims 1-25 were rejected under 35 U.S.C. §112, second paragraph, for indefiniteness; Claims 1-4 were rejected under 35 U.S.C. §103(a) for obviousness over Cook in view of Landsman optionally considering Braudy et al.; Claims 1-3 and 9-25 were rejected under 35 U.S.C. §103(a) for obviousness over Cook in view of Tatah '462 or Addiego et al.; Claims 5, 6, 9 and 10 were rejected under 35 U.S.C. §102(b) for anticipation by Hase et al.; and the disclosure was found to be objectionable because of certain informalities.

Since dependent Claim 7 has again not been rejected on its merits, it appears to the applicants' attorneys that Claim 7 continues to be allowable over the prior art references of record.

Concerning the objection to the disclosure, Claims 15 and 18-22 have not been amended because the terms "QR Code" and "Veri Code" are believed to be adequately defined in the specification on page 18 at lines 22-24 as types of codes belonging "to a minute code or a bar code (that) can be used with sufficient heat-resistance . . . ." (Word in parentheses added.)

Nevertheless, for the purpose of explanation, a four-page paper entitled "Solution-About-QR Code" accompanies this Amendment. If was obtained on the Internet from the website "www.denso, co.jp" maintained by the Denso Corp. of Japan. The paper explains that the QR (Quick Response) Code is a two-dimensional symbology. Veri Code is a two-dimensional matrix code similar to the QR Code. The Veri Code was publicly announced and made available by Veritec Inc. in 1990. Therefore, withdrawal of the objection to the disclosure is respectfully requested.

Concerning the rejection of Claims 1-25 under 35 U.S.C. §112, second paragraph, for indefiniteness, Claims 4 and 7 have been canceled, Claim 8 has already been canceled, and Claims 1-3, 5, 10 and 13 have been amended to remove the indefinite language pointed out by

the Examiner. Therefore, careful reconsideration and withdrawal of the rejection of remaining Claims 1-3, 5, 6 and 9-25 under 35 U.S.C. §112, second paragraph, for indefiniteness are respectfully requested.

Independent Claims 1 and 5, as again amended, both recite a method for marking materials using a marking material and a material to be marked consisting of a light transparent body or a laser transmittive body.

In Claim 1, the method is recited as comprising a first process of placing a surface of the material to be marked and a surface of the marking material together with a desired gap therebetween.

Independent Claim 1 has been amended to recite the subject matter of canceled dependent Claims 4 and 7, i.e. that the deposit caused to degenerate by irradiation by the second laser beam is changed in color by heating and that the desired gap is between 2μm and 200μm.

The U.S. Patent of Cook teaches a method for forming a pattern, such as a layer of metallization, by the steps of positioning a pattern material next to a deposition material, heating a portion of the layer, and transferring a pattern.

U.S. Patent No. 5,935,462 of Tatah teaches that the whole substrate can be irradiated by repeated reflection of laser light in the post-treatment process. Although the laser beam is irradiated in order to bind a deposit on the substrate in the post-treatment process of Tatah, the laser beam of the present invention is irradiated instead to form patterns of characters, diagrams or symbols in this second process.

The U.S. Patent of Addiego et al. discloses various laser-based repair processes for high-speed material deposition and removal on a surface.

The U.S. Patent of Landsman discloses a method for making a printing plate from a porous substrate while the U.S. Patent of Braudy et al. merely discloses a transfer recording method generally.

The present invention, as it is now defined in amended Claim 1, is patentably defined over the prior art teachings of Cook, Tatah '462, Addiego et al., Landsman, and Braudy et al. because none of them disclose or suggest that the deposit caused to degenerate by irradiation by the second laser beam is changed in color by heating and that the desired gap is between 2μm and 200μm.

In Claim 5, the method comprises a process of forming patterns of characters, diagrams or symbols on the material to be marked by placing a surface of the material to be marked and a surface of the marking material together with a desired gap therebetween.

Independent Claim 5 further recites the following steps: forming patterns of characters, diagrams or symbols; vaporizing the marking material by irradiating through the material to be marked with a laser beam while scanning with the laser beam; and placing a deposit vaporized from the marking material onto a predetermined portion of the material to be marked. Independent Claim 5 has been amended to recite the subject matter of canceled dependent Claim 7, i.e. that the desired gap is between 2μm and 200μm.

The U.S. Patent of Hase et al. discloses a substrate having a laser absorbing film so that the substrate is heated by the laser beam while it is being transmitted through the substrate.

Thus, the process of Hase et al. is quite different from the method for marking materials set forth in amended independent Claim 5 and dependent Claim 6, 9 and 10 because there is no suggestion or disclosure that the desired gap may be between 2μm and 200μm.

Since none of the cited prior art references either identically disclose or obviously suggest the recited features of the present invention discussed above, it necessarily follows that amended

independent Claims 1 and 5 now patentably define the present invention over the cited prior art references. Remaining dependent Claims 2, 3, 6 and 9-25 are therefore also patentably distinguishable over the applied references.

Consequently, in view of the foregoing amendments and remarks, no further issues are believed to be outstanding and the present application should be considered in clear condition for formal allowance. Therefore, a quick and favorable action to that effect is respectfully requested.

Respectfully submitted,

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IN THE CLAIMS

1. (Twice Amended) A method for marking materials using a marking material and a material to be marked consisting of a light transparent body or a laser transmittive body, comprising:

a first process of placing a surface of said material to be marked and a surface of said marking material together with a desired gap therebetween, vaporizing said marking material by irradiating through said material to be marked with a first laser beam [of a first laser power] while scanning with the first laser beam, and depositing a deposit vaporized from said marking material onto a predetermined portion of said material to be marked; and

a second process of removing [or denaturalizing] a part of said deposit deposited onto the surface of said material to be marked by irradiating with a second laser beam [of a second laser power] while scanning with the second laser beam;

wherein patterns of characters, diagrams or symbols are formed on said material to be marked;

wherein the deposit caused to degenerate by irradiation by said second laser beam is changed in color by heating; and

wherein said desired gap is between 2μm and 200μm.

2. (Twice Amended) A method for marking materials according to claim 1, wherein [laser] power of the first laser [power] beam is greater per unit area than [laser] power of the second laser [power] beam.

3. (Twice Amended) A method for marking materials according to claim 1, wherein the deposit is subject to direct irradiation in the second process without passing the second laser beam through the materials to be marked.

4. (Cancel)

5. (Twice Amended) A method for marking materials, in which marking material and [materials] material to be marked consist of a light transparent body or a laser transmittive body, said method comprising the steps of:

forming patterns of characters, diagrams or symbols on said material to be marked by placing a surface of said material to be marked and a surface of said marking material together with a desired gap therebetween;

vaporizing said marking material by irradiating through said material to be marked with a laser beam while scanning with the laser beam; and

depositing a deposit vaporized from said marking material onto a predetermined portion of the material to be marked;

wherein said patterns of characters, diagrams or symbols are formed by reacting gas existing in said desired gap with the vaporized marking material due to evaporation of said marking material by said laser beam and a reaction product deposited onto the predetermined portion of the material to be marked;

wherein said desired gap is between 2μm and 200μm.

7. (Cancel)

10. (Twice Amended) A marking material of claim 9, wherein a thin film formed on [a] the surface of the [light transparent body or the laser transmittive body] material to be marked is of a thickness of 10 μm or less.

13. (Twice Amended) A marking material according to claim 11, wherein the marking material is a thin film formed on [a] the surface of the [light transparent body or the laser transmittive body] material to be marked.

Solution - About - QR Code

QR Code

What is QR(Quick Response)Code?

QR Code is the 2-D (Two-dimensional) symbology developed by DNESO CORPORATION, whose main focus is on easy data capture for bar code scanners. QR Code has many features, including: the ability to store large amounts of data, capability of high density storage, capability of omni-directional reading, high speed reading and error correction, all of which are carried in other 2-D symbologies.

Encoding a large amount of data

QR Code encodes many types of data such as numeric, alphanumeric, Kanji & Kana and binary codes. A maximum of 7,089 characters (numeric) can be encoded.

Examples of QR Code

59 digits of Kanji & Kana

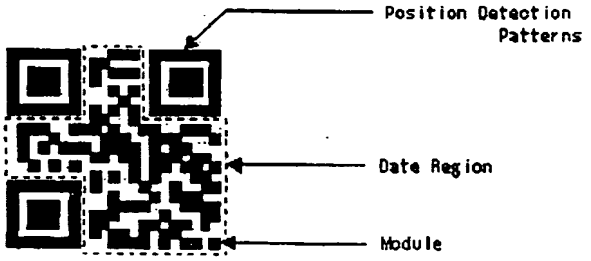
QRコードはデンソーが開発した新しい
2次元コードです。バーコー
ドでは実現が難しかったシステム
もQRコードが解決します。

300 digits of alphanumeric data

ABCDEFGHIJKLMNOPQRSTUVWXYZ0123456789
ABCDEFGHIJKLMNOPQRSTUVWXYZ0123456789
ABCDEFGHIJKLMNOPQRSTUVWXYZ0123456789
ABCDEFGHIJKLMNOPQRSTUVWXYZ0123456789
ABCDEFGHIJKLMNOPQRSTUVWXYZ0123456789
ABCDEFGHIJKLMNOPQRSTUVWXYZ0123456789
ABCDEFGHIJKLMNOPQRSTUVWXYZ0123456789
ABCDEFGHIJKLMNOPQRSTUVWXYZ0123456789
ABCDEFGHIJKL

High speed and omni-directional reading

QR Code is capable of 360 degree (omni-directional) - high speed reading. QR Code accomplishes this task through position detection patterns located at the three corners of the symbol. These position detection patterns, guarantee stable high-speed reading, circumventing the negative effects of background interference.



Data encoding in a smaller space

Since QR Code carries information both horizontal and vertical, QR Code is capable of encoding the same amount of data into an area 10% the size of a traditional bar code.

Efficient encoding of Kanji

Kanji can be encoded as a default character set. Compared to other 2-D symbologies, QR Code is capable of encoding the Kanji character set with 20% fewer bits.

High durability against dirt and damage

QR Code has error correction capability. Data can be restored even if the symbol is damaged. A maximum 30% of codewords*1 can be restored*2.

*1: Codeword is a unit that constructs the data region. In the case of QR Code, one codeword is equal to 8 bits.
*2: Data restoration may not be fully performed depending on the amount of dirt or damage.

Specifications

Symbol Size	21 X 21 - 177 X 177 modules (size grows by 4 modules/side)	
Type & Amount of Data (Mixed used is permitted.)	Numeric	Max. 7,089 char.
	Alphanumeric	Max. 4,296 char.
	8-bit byte (Binary)	Max. 2,953 char.
	Kanji	Max. 1,817 char.
Error Correction (Data Restoration)	Level L	Approx. 7% of codewords can be restored.
	Level M	Approx. 15% of codewords can be restored.
	Level Q	Approx. 25% of codewords can be restored.
	Level H	Approx. 30% of codewords can be restored.
Structured Append	Maximum 16 symbols	

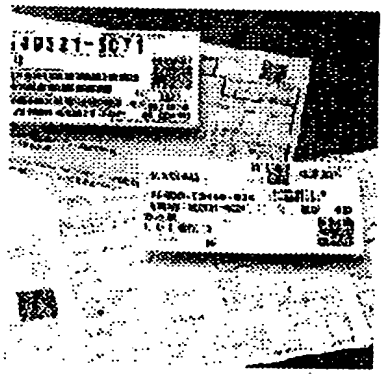
Standardization

To have QR Code more accessible to everyone, the standardization of QR Code has been promoted.

Oct. 97:	AIM International Standard (ISS - QR Code)
Mar.98:	JEIDA (Japan Electronic Industry Development Association) Standard (JEIDA-55)
Jan. 99:	JIS (Japanese Industrial Standard) (JIS X 0510)
May. 00:	ISO (The International Organization for Standardization) (ISO/IEC18004)

QR Code Applications

Large amount of data



Order Form, etc.

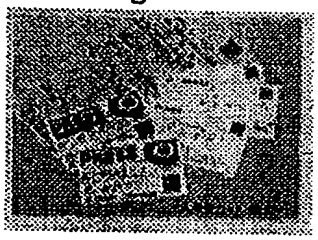
High-density data storage

Price Tag, etc.

High speed and omni-directional reading

Automatic sorting system, etc.

Kanji and Kana encoding



Business cards, Attendance management, etc.

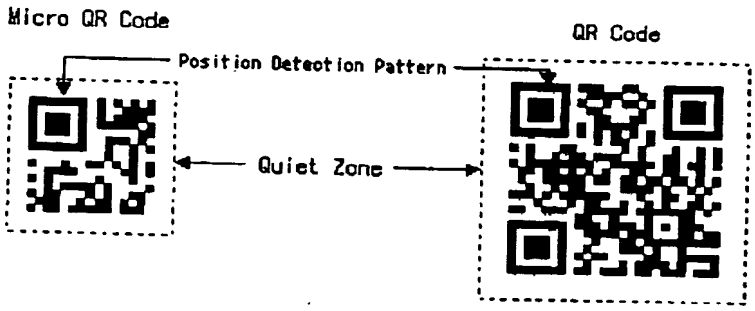
QR Code fits any application.

Micro QR Code

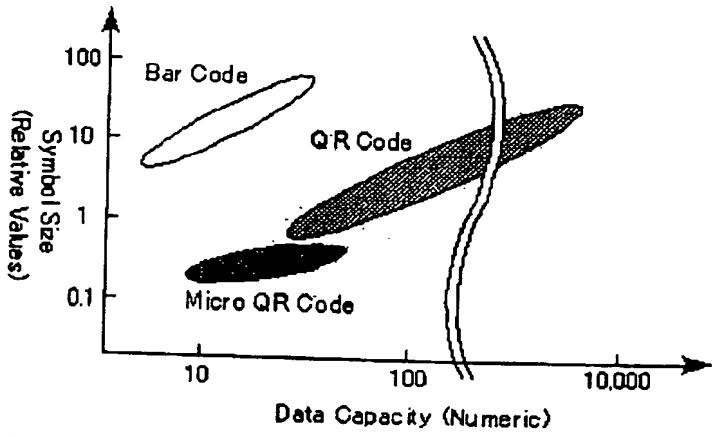
What is Micro QR Code?

What is Micro QR Code? Micro QR Code is a very small QR Code that fits applications that require a smaller space and use smaller amounts of data such as ID of printed circuit boards and electronics parts, etc. The efficiency of data encoding has been increased with the use of only one position detection pattern.

Structure of Micro QR Code



Data Capacity and Symbol Size



Symbol Version and Data Capacity

Version	Modules/ Side	Error Detection/Correction	Data Capacity			
			Numeric	Alphanumeric.	8-bit Byte	Kanji
M1	11	-	5	-	-	-
M2	13	L	10	6	-	-
		M	8	5	-	-
M3	15	L	23	14	9	6
		M	18	11	7	4
M4	17	L	35	21	15	9
		M	30	18	13	8
		Q	21	13	9	5